

WHAT IS CLAIMED IS:

1. A method of generating a synthetic key frame, comprising the steps of:

5 receiving a video stream from a first source and dividing it into meaningful sections;

selecting key frame(s) or key region(s) representative of a divided section; and

10 combining the selected key frame(s) or key region(s), to generate one synthetic key frame.

2. The method of generating a synthetic key frame as claimed in claim 1, wherein the dividing step further comprises the step of receiving a video stream from a second source and dividing it into meaningful sections.

15 3. The method of generating a synthetic key frame as claimed in claim 1, wherein the selecting step further comprises the step of selecting key frame(s) or key region(s) output from the second source.

20 4. The method of generating a synthetic key frame as claimed in claim 1, wherein the section is a unit of segment.

5. A method of describing synthetic key frame data, comprising the steps of:

25 dividing a video stream into meaningful sections, and synthesizing a

key frame or key region representing the content of each section into one image,  
to generate a synthetic key frame; and

describing a list of key frame and/or key region included in constituent  
elements of the synthetic key frame.

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6. A method of describing synthetic key frame data as claimed in  
claim 5, wherein the describing step includes:

an ID for identifying the synthetic key frame;

a representative segment locator which describe the temporal  
10 information of the segment that the synthetic key frame represent; and

key frame list or key region list for identifying the elements of the  
synthetic key frame;

wherein the describing step can additionally include

a fidelity value indicating how faithfully the synthetic key frame  
15 represent the segment, and

information on the arrangement of each constituent element when the  
key frame or key region is displayed as the constituent element of the synthetic  
key frame .

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7. A method of describing synthetic key frame data as claimed in  
claim 6, wherein the information about the arrangement includes two-  
dimensional location information of the constituent element or layer information  
as three-dimensional location information of the constituent element.

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8. A method of describing synthetic key frame data as claimed in

claim 5, wherein, when the synthetic key frame includes the key frame list, each element of the key frame list has a key frame locator as a key frame description unit structure and, when the synthetic key frame includes the key region list, each element of the key region list has a key region locator as a key region description unit structure.

9. A method of describing synthetic key frame data as claimed in claim 8, wherein the key frame locator includes an image locator capable of containing the location, annotation and a related segment with respect to a stored image, as data for designating the key frame, a segment locator for indicating information including a segment locator that designates a segment represented by corresponding key frame, and additionally a fidelity value indicating how faithfully the key frame represents the segment.

10. A method of describing synthetic key frame data as claimed in claim 8, wherein the key region locator, serving as a data structure for describing the key region, is information logically/physically designating stored location or segment data, wherein the key region locator includes an inherent ID for identifying the key region;

an image locator and region area info to locate the region or region data to locate the region; and

a representative segment locator;

wherein the key region locator can additionally include a fidelity value indicating how faithfully the key region represents the segment;

an annotation; and

a list of related segment with the key region.

11. A method of describing synthetic key frame data as claimed in claim 5, wherein, when the synthetic key frame includes the key frame list, each component of the key frame list has fidelity indicating how faithfully corresponding key frame represents the meaningful content in the synthetic key frame, as a key frame description unit structure, and, when the synthetic key frame includes the key region list, each component of the key region list has a fidelity value indicating how faithfully corresponding key region represents the meaningful content in the synthetic key frame, as a key region description unit structure.

12. A method of describing synthetic key frame data, comprising the steps of:

dividing a video stream into meaningful sections, and synthesizing a key frame or key region representing the content of each section into one image, to generate a synthetic key frame; and

generating a combination of key frames or key regions, or key frame and key region included in constituent elements of the synthetic key frame, and physically storing the combination to describe the synthetic key frame.

13. A method of describing synthetic key frame data as claimed in claim 12, wherein the synthetic key frame description includes:

an ID for identifying the synthetic key frame;

an image locator for designating the stored synthetic key frame file;

an ID for identifying the synthetic key frame;

an representative segment locator which describe the temporal information of the segment that the synthetic key frame represent; and

key region list for identifying the elements of the synthetic key frame;

5 wherein the description can additionally includes

a fidelity value indicating how faithfully the synthetic key frame includes section information about a segment represented by the synthetic key frame

and information on the arrangement of the key frame and key region that are the constituent elements of the synthetic key frame.

10 14. A method of describing synthetic key frame data as claimed in claim 12, wherein each element of the key region list of the synthetic key frame constituent elements has a key frame locator or a key region locator.

15 15. A method of describing synthetic key frame data as claimed in claim 14, wherein the key region locator, serving as a data structure for describing the key region, is information logically/physically designating stored location or segment data, the key region locator includes:

20 an inherent ID for identifying the key region, an image locator and region area info to locate the region or region data to locate the region; and

a representative segment locator;

wherein the key region locator can additionally include

a fidelity value indicating how faithfully the key region represents the segment;

25 an annotation; and

a list of related segment with the key region.

16. A method of describing synthetic key frame data as claimed in  
5 claim 13, wherein each element of the key region list includes a fidelity value  
indicating how faithfully corresponding key region represents the meaningful  
content in the synthetic key frame, as a key region description unit structure.

17. A method of describing synthetic key frame data as claimed in  
10 claim 13, wherein the information about the arrangement includes two-  
dimensional location information of the constituent elements or layer information  
that is three-dimensional location information of the constituent elements.

18. A hierarchical video summarizing method using a synthetic key  
15 frame, comprising the steps of:

dividing a video stream into meaningful sections, and synthesizing a  
key frame or key region representing the content of each section into one image,  
to generate a synthetic key frame; and

assigning the synthetic key frame to a key image locator, a hierarchical  
20 summary list for describing lower summary structures, and structural  
information of the video stream.

19. The hierarchical video summarizing method using a synthetic  
key frame as claimed in claim 18, wherein the key image locator is a data  
25 structure for designating an image using a key region locator, a key frame

locator and a synthetic key frame locator.

20. The hierarchical video summarizing method using a synthetic key frame as claimed in claim 18, wherein each hierarchical summary structure is represented by an image representative of a specific segment.

21. The hierarchical video summarizing method using a synthetic key frame as claimed in claim 18, wherein each component of the lower hierarchical summary list uses a hierarchical/recursive summary structure as a lower hierarchical summary structure.

22. The hierarchical video summarizing method using a synthetic key frame as claimed in claim 18, wherein the hierarchical summary structure has summary level information.

23. The hierarchical video summarizing method using a synthetic key frame as claimed in claim 18, wherein the hierarchical summary structure includes a fidelity value indicating how faithfully a part, represented by the lower hierarchical summary list, is expressed.

24. A method for providing a video browsing interface, comprising :  
dividing a video stream into meaningful sections, and synthesizing a key frame or key region representing the content of each section into one image, to generate a synthetic key frame; and

providing a user interface to a predetermined display to browse a video

related with the generated synthetic key frame.

25. The method for providing a video browsing interface as claimed in claim 24, wherein the user interface provides the synthetic key frame in the form of view.

26. The method for providing a video browsing interface as claimed in claim 24, wherein the synthetic key frame is arranged in a time sequence, and the synthetic key frame is arranged in a tree shape.

27. The method for providing a video browsing interface as claimed in claim 24, wherein the synthetic key frame is assigned to each node in TOC form.

28. A non-linear video browsing method, comprising the steps of:  
dividing a video stream into meaningful sections, and synthesizing a key frame or key region representing the content of each section into one image, to generate a synthetic key frame;

providing a user interface to a predetermined display to browse a video related with the generated synthetic key frame;

selecting the synthetic key frame according to an input by a user; and  
reproducing a segment represented by the selected synthetic key frame.

29. The non-linear video browsing method as claimed in claim 28, wherein the reproducing step reproduces a segment related with constituent



elements (key region or key frame) of the contents of the key frame or the key frame selected by the user's input.